THE WORLD BANK

Rural Connectivity and Agricultural Logistics in the Domestic Supply Chains

The “first mile” paradox:

Rural connectivity and agricultural logistics as a barrier to access the domestic market in Vietnam

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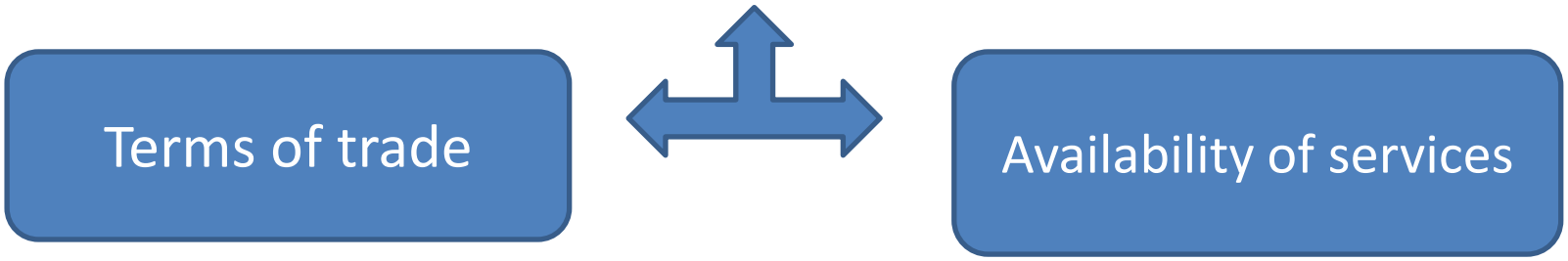
The « first miles » in the value chain are often neglected.

Yet, they are the most difficult.


26K
2301
26K 2301

Rationale of the study

- ✓ Physical connectivity : one pillar of rural livelihoods



- ✓ particularly in remote areas : “first mile” paradox
- ✓ However, less studied than trade policy or investments ..
- ✓ Acting on this constraint may unlock a hidden potential for rural development.
  - Hardware logistics : infrastructures
  - Software logistics: services

Rationale in Vietnam

Rapid improvements:

# communes	1999	2005	
No road access to district center	600	269	..out of 10 602 (2%)

% population	1999	2003	
within 2km all-weather road	73%	76%	+ 2 500 000 people

… but as transport infrastructures improve, the weight of other connectivity factors tends to become more important.

Questions

- ✓ Relative importance of roads vs. other factors constraining connectivity ? transport services; other facilities; institutions, social networks..)

  …"physical" vs. "institutional" connectivity
- ✓ *Where ?*: At which place in the supply chains is connectivity becoming a bigger constraint than just transport costs ?
- ✓ *How much ?:* Costs as % of product value
- ✓ *How:* Which investments are needed ?

Methods

Choice of 2 study locations

	NM	CH
Province	**Son La**	**Dak Nong**
since	1946	2004
District	**Môc Châu**	**Krong Nô**
Kinh	29 %	76 %
« good + » roads	25%	18%
Population	159 000 (75 / km^2)	53 700 (65 /km^2)

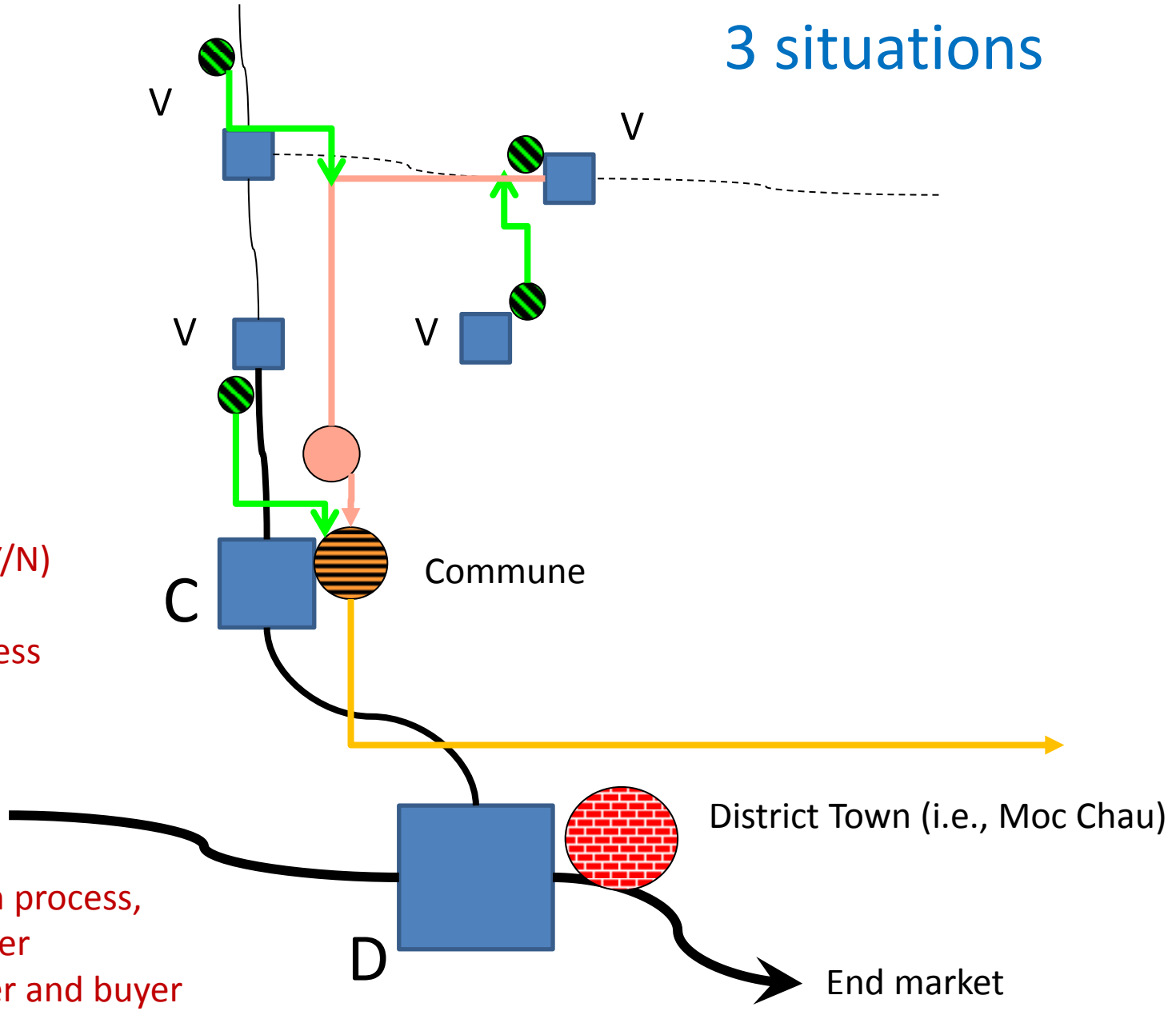
Methods

Choice of 3 products

- ✓1 marketed commodity :
  NM= maize; CH= maize
- ✓1 marketed perishable:
  NM= chayote; CH= pumpkin
- ✓1 imported staple:
  NM= rice; CH = rice

Methods: Selection of communes and villages

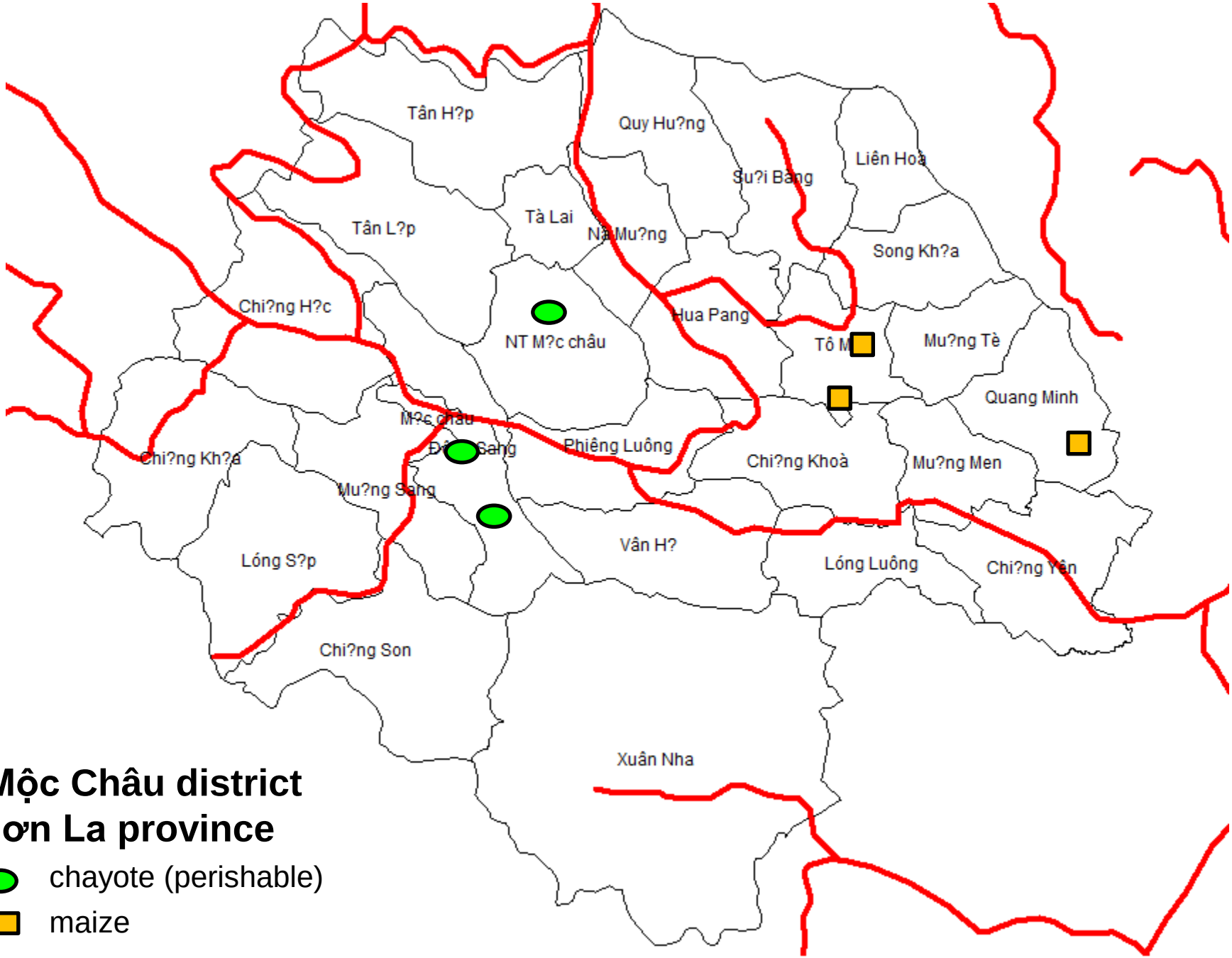
3 situations



V: Villages
C: Commune
D: District

Crop specialization (Y/N)
X
All-weather road access
(Y/N)

Snowball selection process,
From farmer
downstream to trader and buyer



Mộc Châu district
Sơn La province

chayote (perishable)

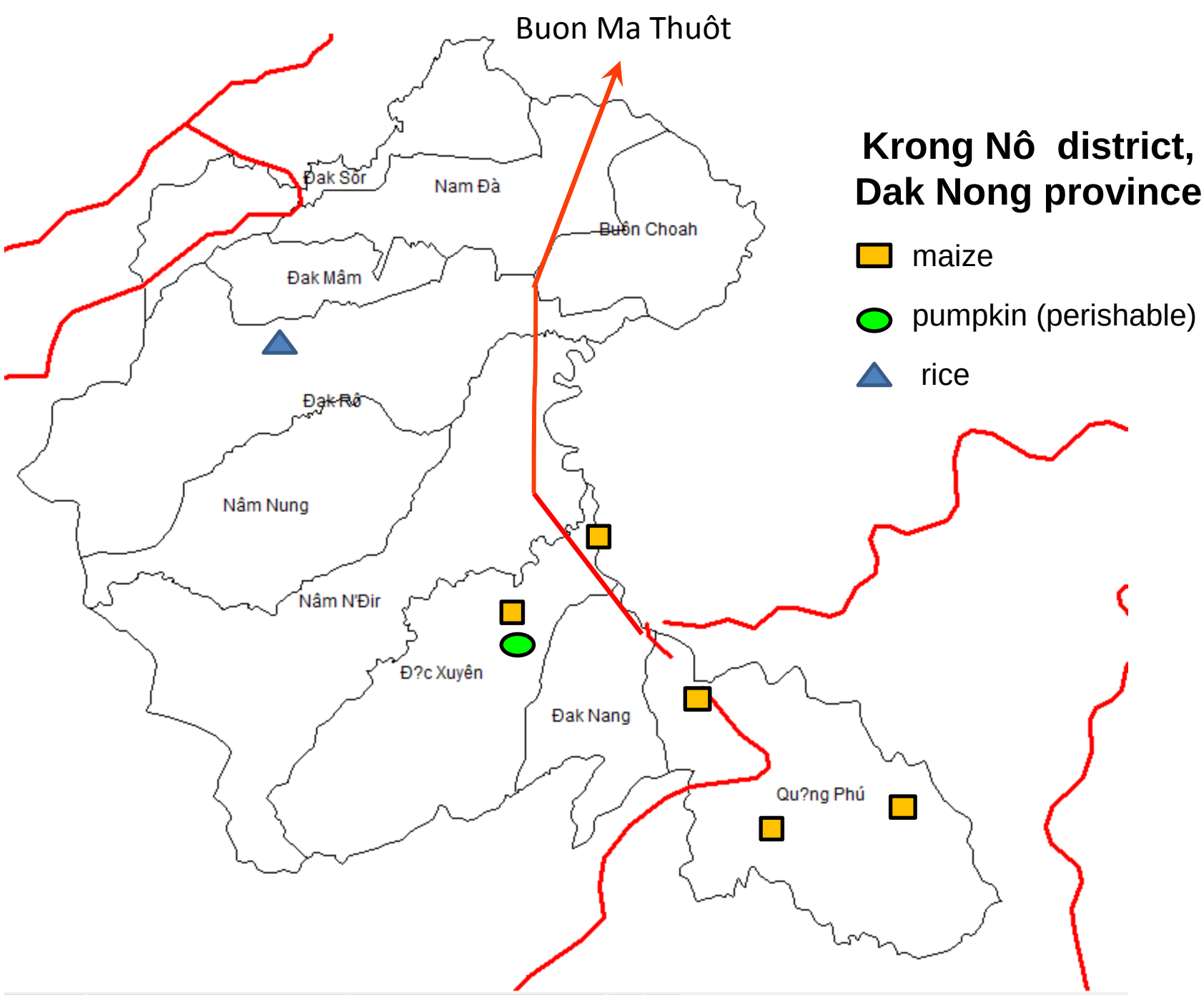
maize

Sample of players interviewed in Mộc Châu
(Snowball downstream)

MAIZE *Communes:*	To Mua		Quang Minh	Total
Villages:	*Remote*	*Connected*	*Remote hamlet*	
Farmers	2	2	3	7
Collectors/Transporters	1	1	1	3
Dryers	1	1		2
Wholesalers/Transporters		1	1	2

CHAYOTE *Communes:*	Dong Sang		Moc Chau Farm Town	Ha Noi	Total
Villages:	*Remote*	*Connected*	*Remote*		
Farmers	3	3	3		9
Collectors/Transporters	1	1	1		3
Wholesalers				1	1
Retailers				1	1

RICE *Communes:*	Dong Sang	To Mua	Quang Minh	Mộc Châu Farm	Total
Consumer-farmers	2	2	3	3	10
Retailers	1	1	1	1	4


Buon Ma Thuôt
Đak Sôr
Nam Đà
Buôn Choah
Đak Mâm
Đak Rô
Nâm Nung
Nâm N'Đir
Đ?c Xuyên
Đak Nang
Qu?ng Phú
Krong Nô district,
Dak Nong province
maize
pumpkin (perishable)
rice

Sample of players interviewed in Krông Nô

Communes :	Duc	Xuyên	Quang	Phu	Tan	Thanh	Total
Villages:	(close) Xuyên Hà	(remote) Bon Choih	(close) Phú Xuân	(remote) Phú Lợi	(close) Đắk Lưu	(remote) Đăk Ri	
MAIZE							
Farmers	2	2	1	1	2	2	**10**
Collectors/transporters	1	1	1	1	1	1	**6**
Wholesalers in district	2	1	1		1	1	**6**
Wholesalers out of district	1	1		1			**3**
PUMPKIN							
Farmers		2					**2**
Collectors		2					**2**
Wholesalers in District		1					**1**
Wholesaler out of District		1					**1**
RICE							
Farmers-consumers	1	2	2	2		1	**8**
Miller						1	**1**
Retailers	1	1	1	1		2	**6**
Wholesalers in district	1	1	1	1			**4**
Total	**9**	**14**	**7**	**7**	**4**	**8**	**50**

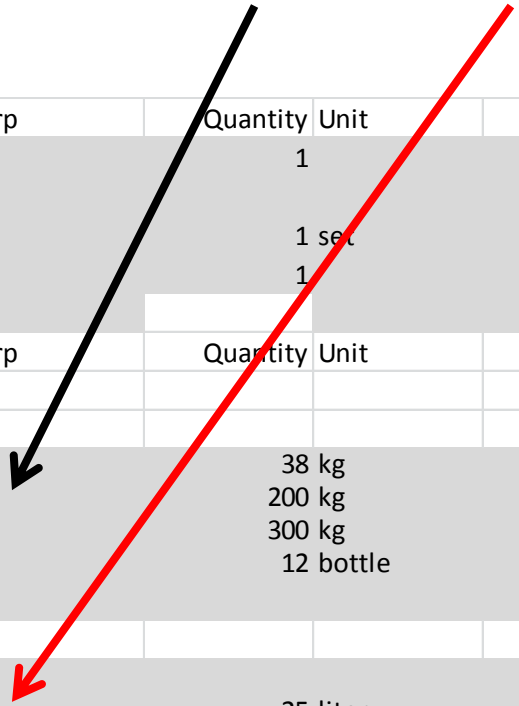
Methods
Data collection and processing

- Questionnaires
- Reported on Excel format, with
  - output of farmer = input of trader 1
  - Output of trader 1 = input of trader 2
  - etc.

Here is the rationale for the computation of the share ratio					
Value	Year	alue per year	a Km per year	Trip dist	hare per year
500 000 000	10	50000000	44000	440	0.01

Budget templates

For each agent of a given value chain a budget template is filled up allowing to differentiate cost between **non-transport** and **transport.**



Category	Item	Trp	Quantity	Unit	Unit price	Share	Lifetime	Value
1.Fixed cost	Sprayer	N	1		1100000	0.700	4	192 500.0
	Set of tools (hoes, rakes, shovels, etc.)	N	1	set	200000	0.700	2	70 000.0
	Maize shelling machir	N	1		5000000	1.000	4	1 250 000.0
								0.0
Category	Item	Trp	Quantity	Unit	Unit price	Share		
2.Input in process		N				1.00		0.0
3.Material input	Seed	N	38	kg	110000	1.00		4 180 000.0
	N (urea)	N	200	kg	15000	1.00		3 000 000.0
	NPK	N	300	kg	5800	1.00		1 740 000.0
	Herbicide	N	12	bottle	130000	1.00		1 560 000.0
								0.0
4.Service	Fuel to transport maize to point of	T	25	liter	31000	1.00		775 000.0

Source: Moc Chau Line 6 Maize from Quang Minh to Hung Yen.xls

Transport costs take into account the return trip when it is not used for shipping in-coming products

Consolidated account

A consolidated account per line per unit of equivalent output, using processing ratios

	1.Fixed cost	2.Commodity in process	3.Material input	4.Service	5.Labour	6.Taxes	7.Ouput in process	8.Other output
Farmer	135	0	938	69	0	0	4 537	0
Trader 1	0	4 537	0	0	0	0	4 653	0
Trader 2	44	4 653	149	0	49	0	5 444	0
Trader 3	198	5 444	154	0	138	0	6 200	17
Trader 4	23	6 200	190	0	36	13	6 600	0
Total	**401**	**20 834**	**1 431**	**69**	**223**	**13**	**27 434**	**17**

A consolidated account of transport cost per line per unit of equivalent output

	1.Fixed cost	3.Material input	4.Service	5.Labour	6.Taxes
Farmer	0	0	69	0	0
Trader 1	0	0	0	0	0
Trader 2	25	149	0	0	0
Trader 3	0	0	0	0	0
Trader 4	23	190	0	36	13
Total	**49**	**339**	**69**	**36**	**13**

Analytical tables

Total costs, income and net revenue per agent and share per line

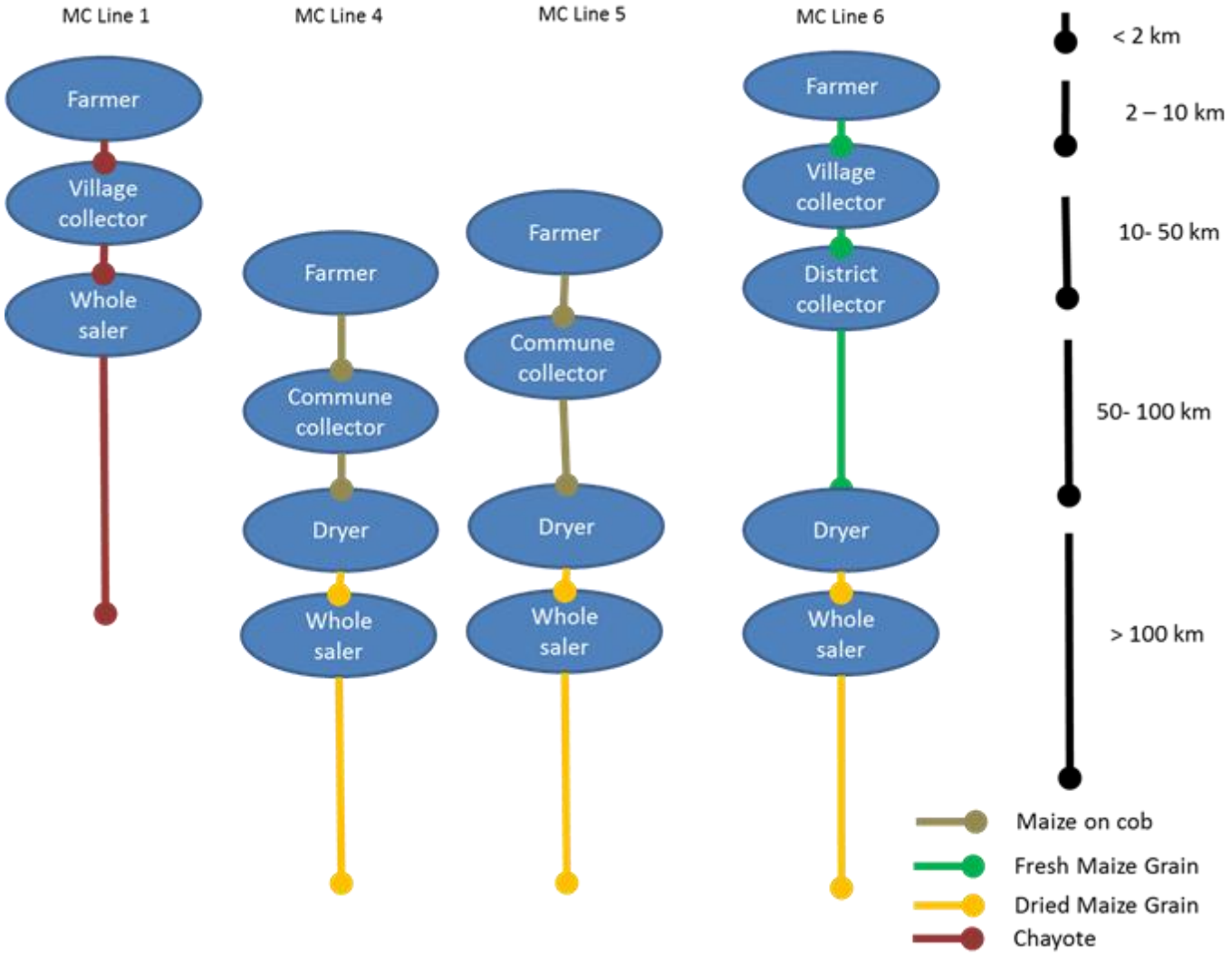
Agent	Tot Cost	ommodity	Revenue	et income	Share
Farmer	1 142	1 142	4 537	3 394	51%
Trader 1	4 537	0	4 653	116	2%
Trader 2	4 895	242	5 444	549	8%
Trader 3	5 935	491	6 217	282	4%
Trader 4	6 462	262	6 600	138	2%
Total		1 872	6 600	6 600	100%

Transport cost per agent and distance covered

Agent	Tot Trasnport cost	Share of transport	Km	Cost per km per
Farmer	69	6%	1	69.35
Trader 1	0	0%	0	0.00
Trader 2	174	72%	22	7.92
Trader 3	0	0%	0	0.00
Trader 4	262	0%	285	0.92
Total	506	27%	308	1.64

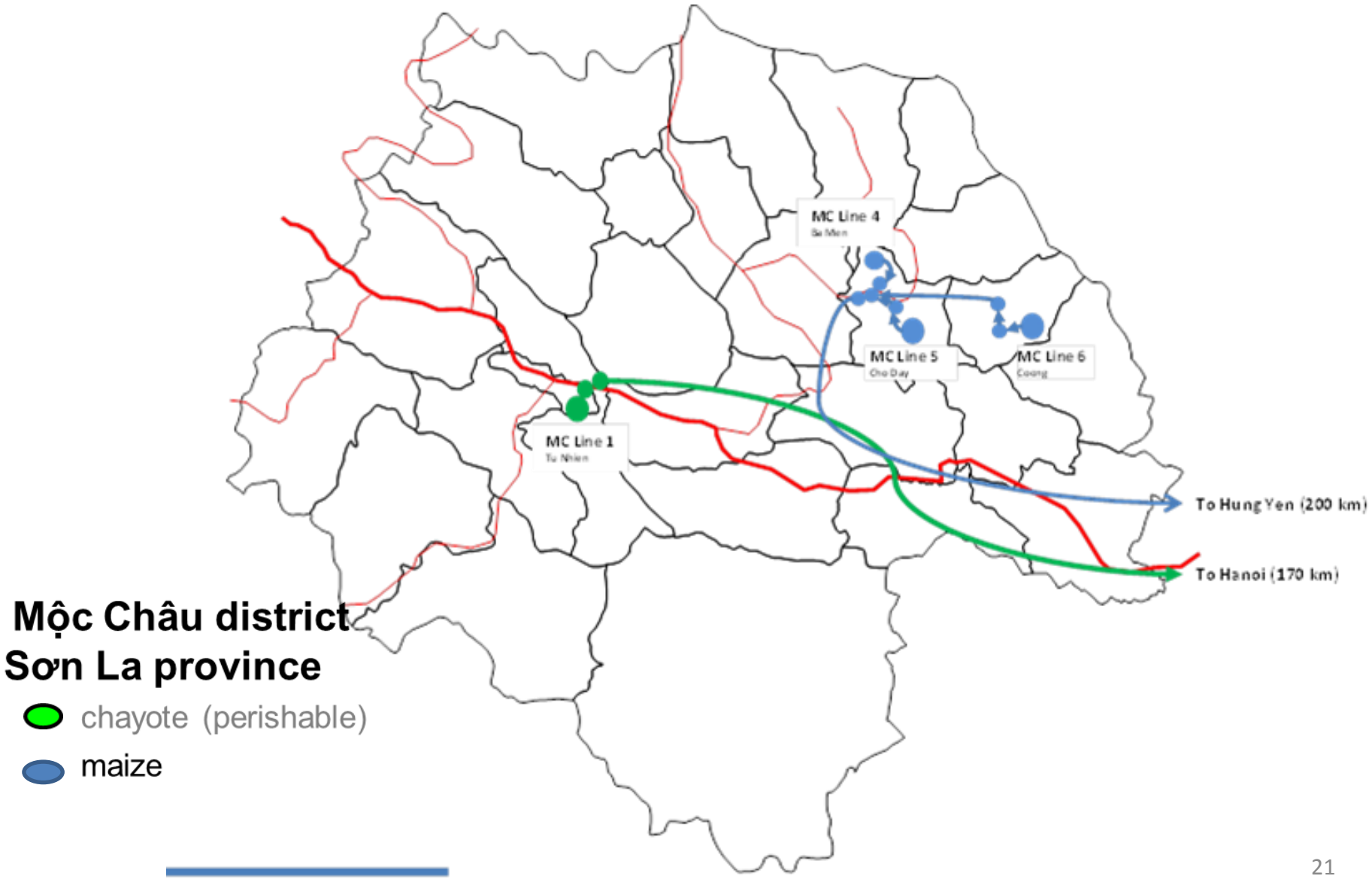
Results

Moc Chau marketing lines : structure

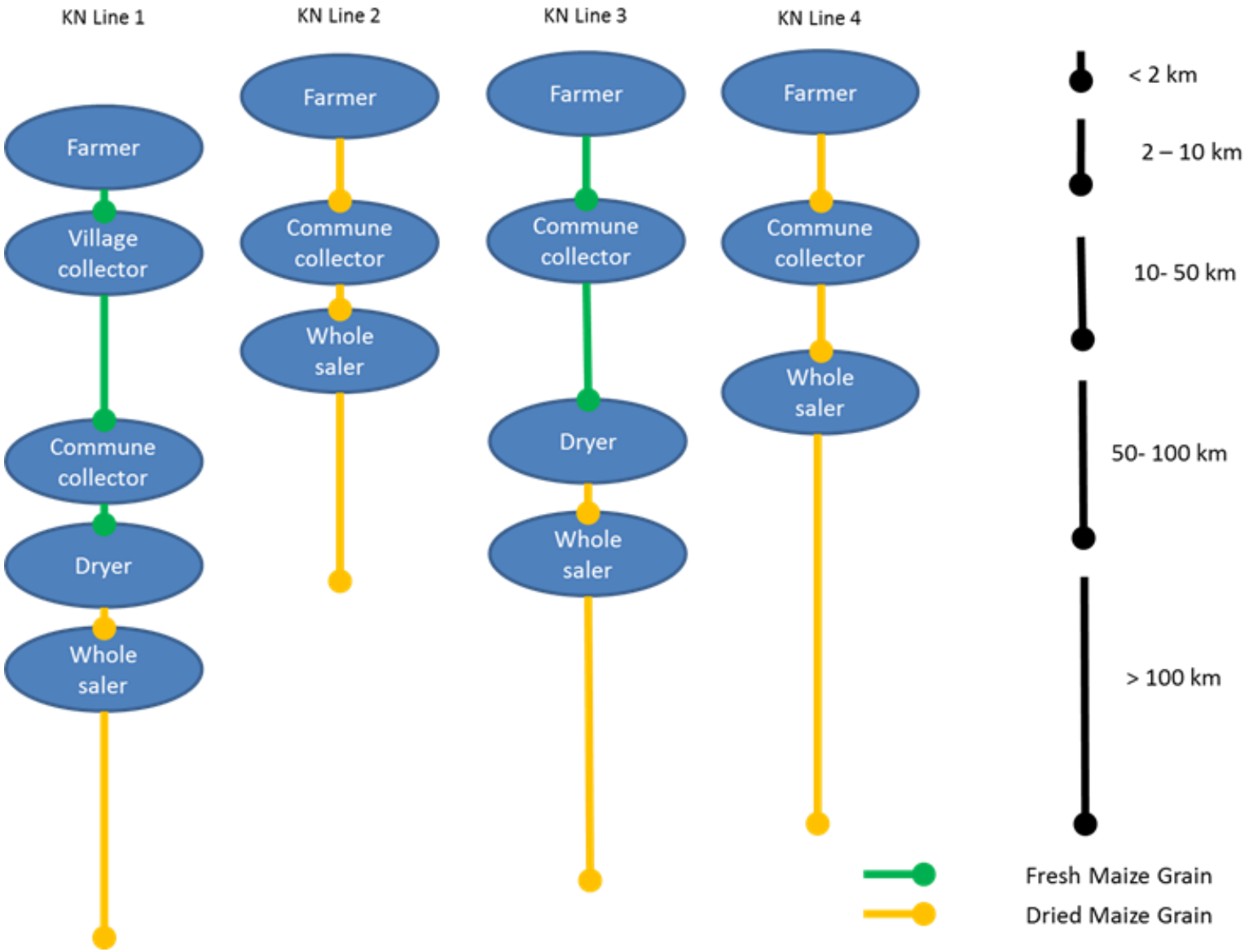


Results

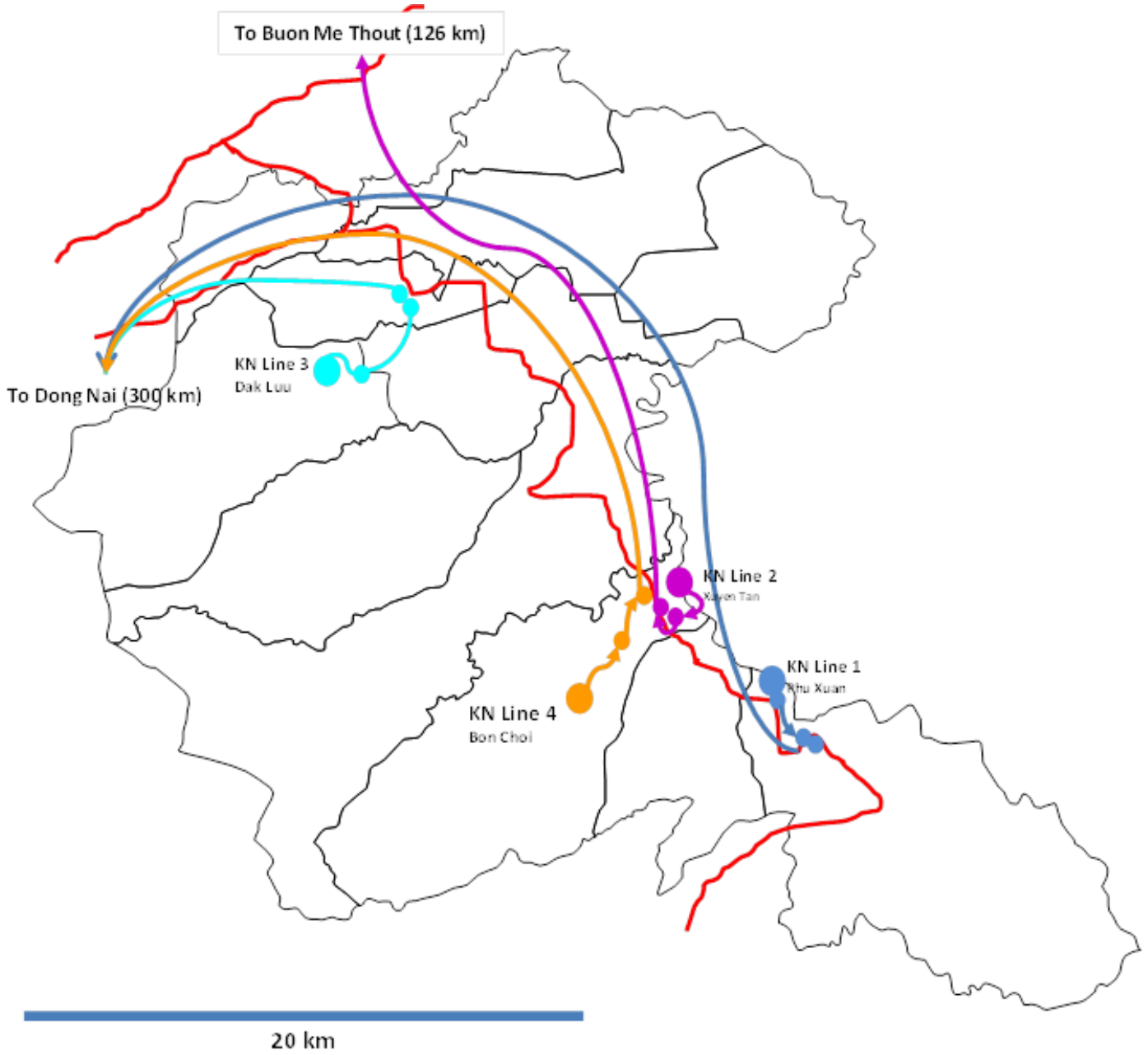
Moc Chau marketing lines : spatial configuration



Results Krông Nô marketing lines: structure



Results Krông Nô marketing lines : spatial configuration



Analysis : Transport performance and connectivity

Distribution of profit among players per marketing line

Line: Players	KN Maize 1	KN Maize 2	KN Maize 3	KN Maize 4	MC Chayote 1	MC Maize 4	MC Maize 5	MC Maize 6
Farmer	74%	91%	80%	67%	79%	61%	54%	66%
Village collector	4%	n.a.	n.a.	n.a.	12%	n.a.	n.a.	5%.
Commune collector	7%	7%	5%	22%	n.a.	6%	12%	12%
Dryer	10%	n.a	10%	n.a	n.a.	29%	30%	16%
Wholesaler	5%	1%	4%	10%	10%	4%	3%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

- Farmers highest share (short channels..) but smallest volumes
- Dryers: 14% on average – especially when processing from cob
- Higher share of profit is going to collectors, compared to wholesalers: may be explained by costs, risks or low competition.

Analysis : Transport performance and connectivity

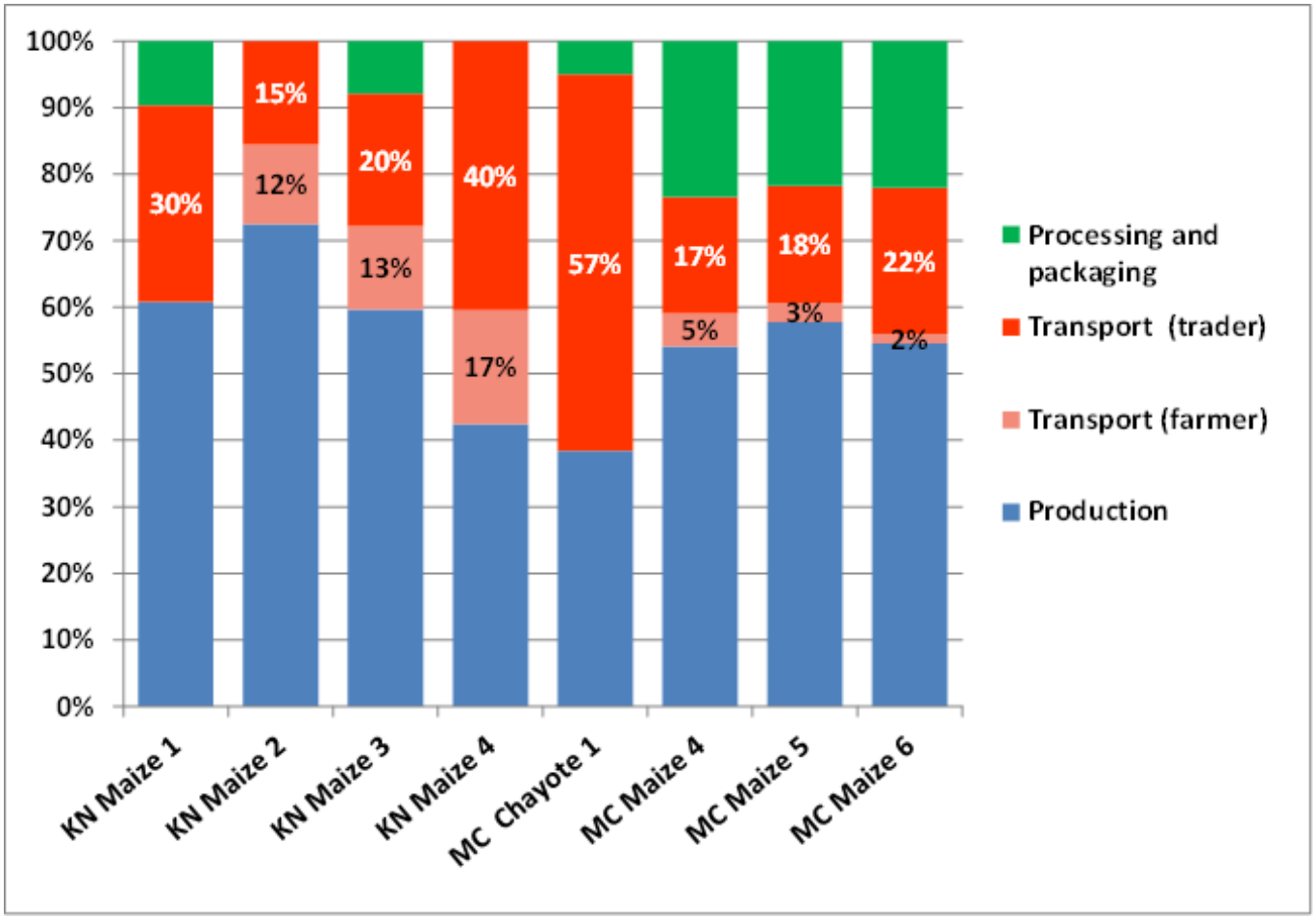
Return to cost and to family labour

Marketing Line: Players	KN Maize 1	KN Maize 2	KN Maize 3	KN Maize 4	MC Chayote 1	MC Maize 4	MC Maize 5	MC Maize 6
Farmer	155%	146%	143%	153%	210%	261%	156%	259%
Return to family labor (VND/day)	*118,000*	*160,000*	*144,000*	*161,000*	*180,000*	*146,500*	*121,000*	*177,073*
Village collector	3%				10%			6%
Commune collector	5%	5%	4%	18%		7%	13%	12%
Dryer	7%		6%			28%	26%	13%
Wholesaler	3%	1%	3%	6%	5%	3%	2%	2%

- Return to family labour (118 to 180 000 Vnd/d) is higher than remuneration of on-farm labour (80 to 100 000 Vnd/day)

Analysis : Transport performance and connectivity

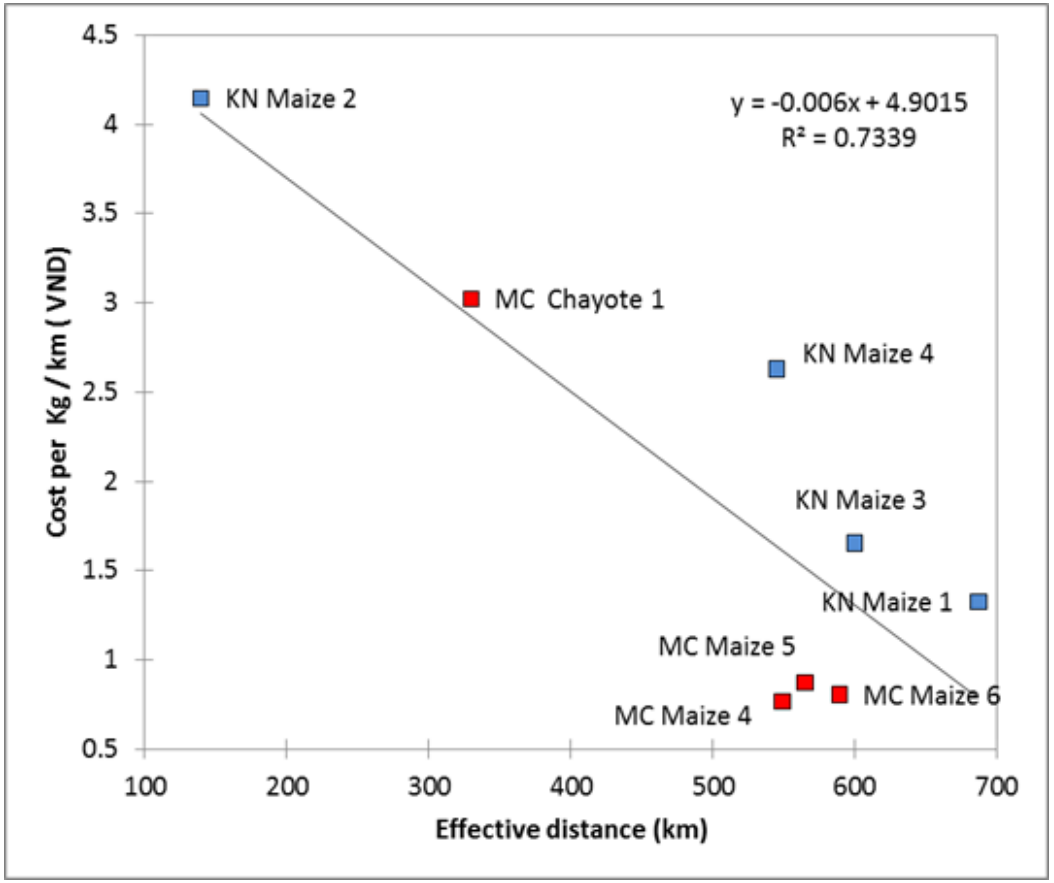
Cost distribution, per main function (% of total costs)



- Transport costs: 33% on average; highest for MC. Chayote (57%)
- Perishable chayote is not adapted to bulking process: better short rotations with smaller vehicles,in order to reduce losses.

Analysis : Transport performance and connectivity

Relation between effective distance and transportation cost

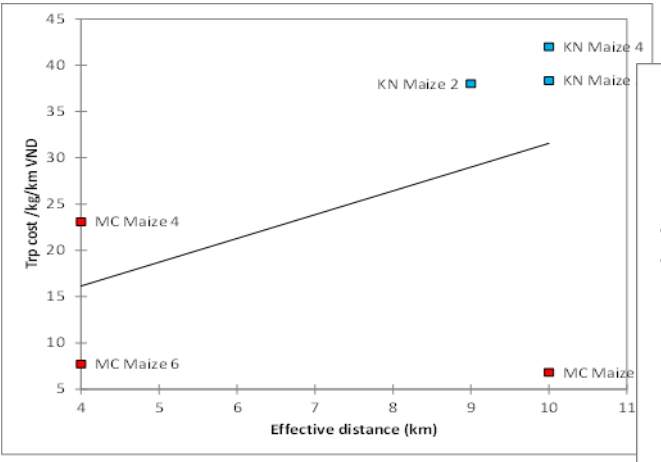


- Long distance transport compensates the higher costs: there are economies of scale (or economies of distance)
- But long distance are not synonymous of highly profitable lines.
- Effective distance: taking in account return trip (full or empty ?)

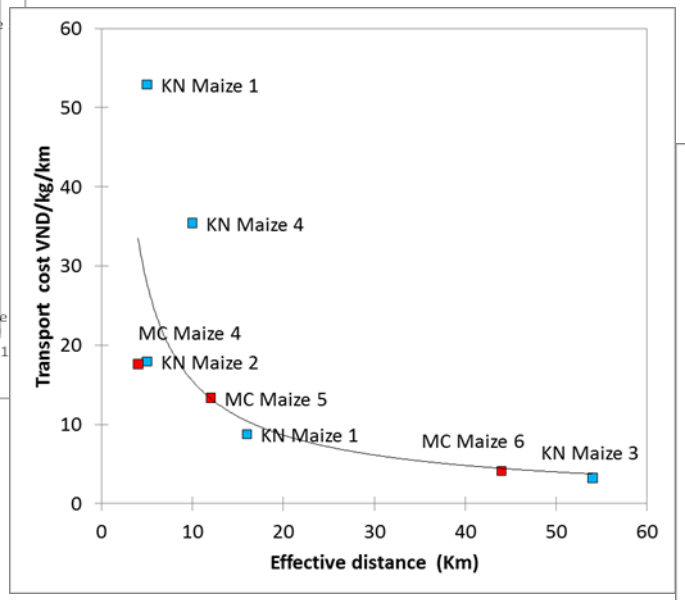
Analysis : Transport performance and connectivity

Transport costs per category of players

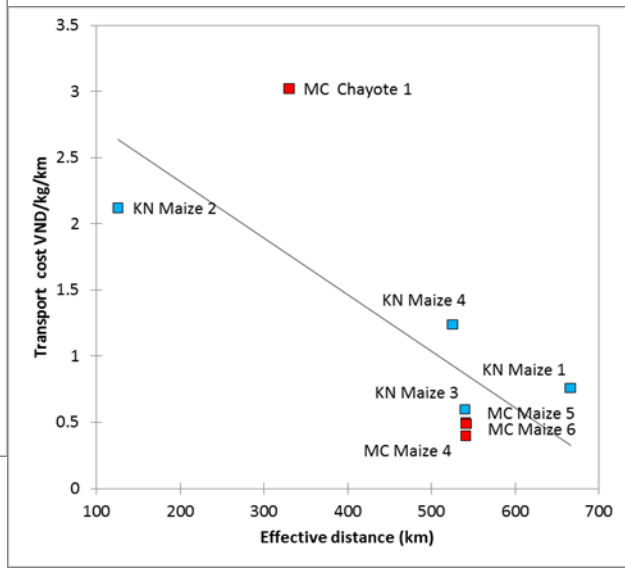
Farmers:



Collectors:



Wholesalers:



- Farmers: limited scope for economies of scale in transport.
  - Collectors: sharp decrease in transport costs when > 10 km
    - Wholesalers: linear decrease. They fully benefit from gains in transport productivity.

Lessons learned for inclusive markets

1 : Logistics hampers, bot does not impede, market access. Farmers' trade benefit is higher than local labour opportunity cost.

2 : Wholesalers = key investors in transport and drying facilities; cost-efficient

3 : The more remote the area, the costlier the kilometer transported. And less efficient.

4 : Remote areas: scarce and expensive credit

5 : Optimization of return loads

Two local « market access champions »

Xe Cay (4 WD trucks): N.W.mountains

Công nong (2W, polyvalent) C.Highlands

Take home message:

- **Infrastructures and roads** (« hardware logistics ») are essential
- But they are not sufficient
- **Value chain services** « software logisitcs » are also required:
  - Input provision
  - Credit
  - Transportation services


Buon Choi, Xã Đức Xuyên (Krông Nô) 2012

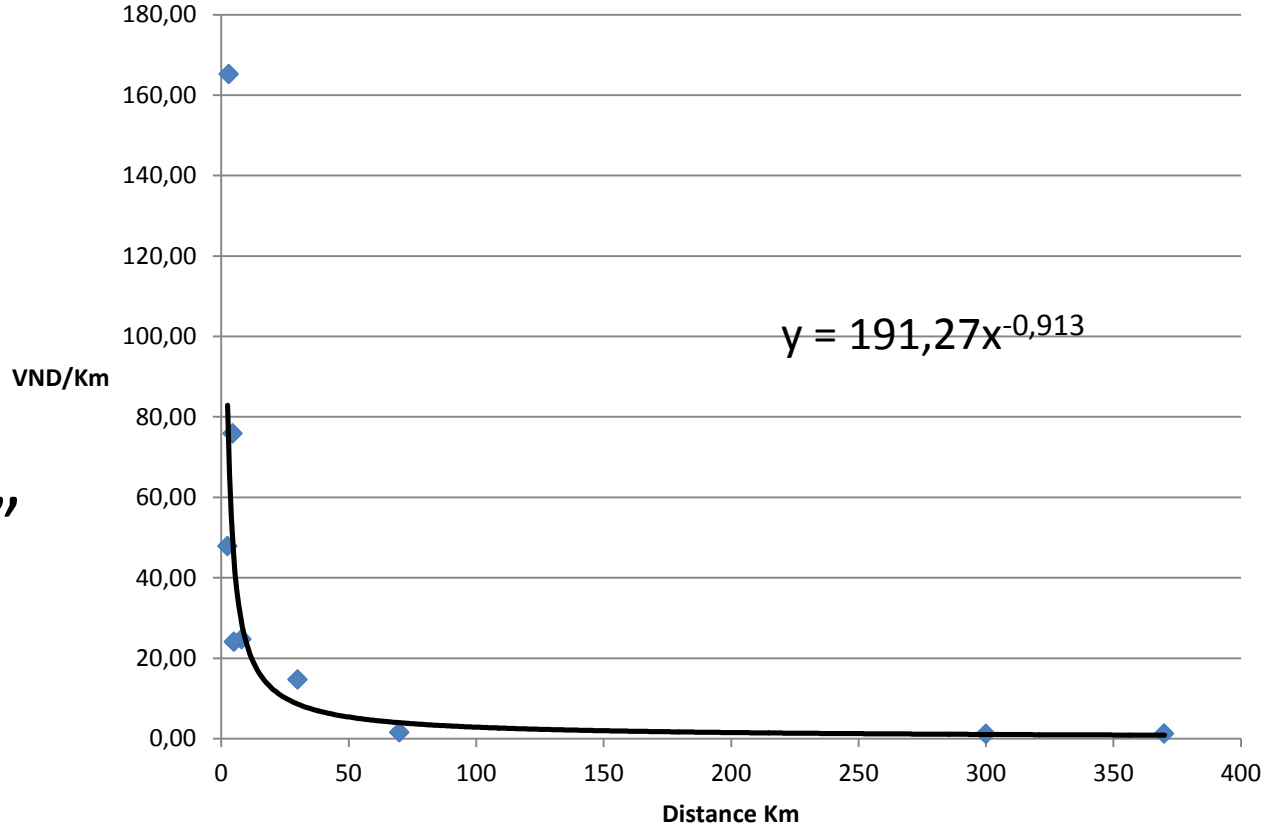
Buon Choi, Xã Đức Xuyên (Krông Nô) 2013

XIN CÁM ƠN !
Thank you for your attention!

Methods

Data interpretation

Transport costs for maize in Krong Nô (VND / T / km)



"first mile" paradox

Methods

Data interpretation

- Based on transport costs variation per capacity and distance it is possible to simulate the impact of changes in transport cost through:
  - Modification of the bulking point (closer to the farm)
  - Changing the scale of shipment (small to big truck)
  - Modification of the level of transport capacity utilization on the return trip